

BLYUMENFEL'D, L. A.

PA 19/49T9

USSR/Chemistry - Hydrocarbons
Chemistry - Electrons, Levels of

Sep/Oct 48

"Electron Levels of Hydrocarbons With Conjugate
Dual Bonds," L. A. Blyumenfel'd, 3½ pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XII, No 5

The improved antisymmetrized molecular orbit
method of studying electron reaction directly
(without parameters) previously used only for
calculating electronic levels of benzene and
associate problems. Here author extends method
to molecules of any symmetry.

19/49T9

BLYUMEFEL'D, L. A.

PA 9/49T84

USSR/Physics

Jul 48

Molecular Structure

Electrons, Levels of Molecules

"Comment on A. S. Davidov's Article 'Computations on the Low Electron Levels of Naphthalene Molecules,' " L. A. Blyumenfel'd, 1½ pp

"Zhur Eksper i Teoret Fiz" Vol XVIII, No 7 ~~1937~~

Comments on several errors in Davidov's book and states that for correct solution scientists should refer to a book which Blyumenfel'd will publish soon.

9/49T84

BLYUMENFEL'D, L. A.

PA 9/49T95

USSR/Physics

Sep 48

Electrons, Levels of
Mathematics, Applied

"Electron Level of Sterol Molecules and General
Methods for Obtaining Secular Equations," L. A.
Blyumenfel'd, Phys-Chem Inst imeni L. Ya. Kanpov,
3 pp

"Zhur Eksper i Teoret Fiz" Vol XVIII, No 9, 837

Computes single electron levels of a sterol mole-
cule by localization of pairs method. Gives general
method for obtaining secular equations for symmetry
for any basic canonical structures.

9/49T95

[illegible]

BLYUMENFEL'D, L. A.

PA 48/49T29

USSR/Chemistry - Spectra Jan 49
Chemistry - Molecular Structure

"The Number of Singlet States of Complex
Molecules," L. A. Blyumenfel'd, Physicochem
Inst imeni L. Ya. Karpov, 1 $\frac{1}{2}$ pp

"Zhur Fiz Khim" Vol XXIII, No. 1 p. 13

Reveals results based on a general formula on
subject obtained by two methods: (1) Method of
valence structures and (2) method of molecular
orbits. However, ionic structures are taken
into account in first method, and antisymmetric
functions of molecule condition in second method.
Gives four mathematical formulas. Submitted 29 Apr 48.
48/49T29

Q. 4.

Absorption spectra of a naphthalene solution from 20 to -140°. 1. A. Il'yumenskiy (Karpov Phys.-Chem. Inst., Moscow). *Zhur. Fiz. Khim.* 24, 848-46 (1950); cf. C.T. 43, 2844. The absorption spectra of frozen $C_{10}H_8$ solids repeat the electron-vibrational structural spectra of the vapors. The study of the temp. relation of the intensity of various bands permits the interpretation of the electron vibrational spectra of $C_{10}H_8$. By combination of the spectroscopy of vapors and frozen solids, at low temps., one has a good method for the interpretation of the spectra of complex molecules.
Paul W. Howerton

BLYUMENFELD L.A. AND CHARNYI A.M.

4149. Blyumenfeld L.A. and Charnyi A.M. Compound of haem with albumin. Spectrum study Doklady Akad. Nauk S.S.S.R. 1950, 73 (1001-1003)

Spectrum study of blood from a patient with enterogenic methaemoglobinemia revealed intense absorption near 620 mμ. increasing in absorption with dilution and suffering a temporary shift upon dilution. The 620 mμ. band declined in absorption with time while that at 576 mμ. (oxyhaemoglobin band) increases until equilibrium is reached in several hr. The results indicate formation, in vivo, of a pigment methaemalbumin. In normal subjects no such effect is seen. Possibly the phenomenon is explained by loosening the link of the haem to protein in haemoglobin, thus permitting the former to be transferred to plasma albumin.

G. M. Kosolapoff (Chemical Abstracts) (II, 6)

SO. Excerpta Medica Section II Volume 4 Number 8

Transhemation reaction. I. A. Blyumenfeld and A. M. Charnyi. *Doklady Akad. Nauk S.S.S.R.* 73, 873-4 (1950); cf. *C.A.* 44, 685d. — As shown earlier, the heme of hemolyzed blood may depart from the globin and become affixed to the plasma albumin even at room temp. This transhemation reaction was studied between oxyhemoglobin and gelatin. The spectrum of a soln. of oxyhemoglobin in colloidal soln. of gelatin changes in time and becomes stable only after several days at room temp. (a few hrs. at 38°); the reaction even succeeds in solid gelatin films. The 414 mμ band of oxyhemoglobin at pH 6.2 is lowered to 411 mμ and loses much intensity; a weak max. at 530 mμ appears. Upon reduction with Na₂S₂O₄, a wide asym. band at 558 mμ appears. The violet band is displaced to 429 mμ. The product formed is termed hemogelatin. If a little cysteine is present during the reaction the product shows a band at 615 mμ, which is unattacked by Na₂S₂O₄ (characteristic of sulfohemoglobin). The rate of transhemation rises with increase of gelatin concn. but declines with increase of oxyhemoglobin concn. Thus the 1st step may be disocn. of the latter into globin and heme (which oxidizes to hemin) and the order of the reaction is less than unity (about 0.9). The reaction rate is a measure of the bond strength between heme and globin and might be useful in studies of pathological disturbances. G. M. Komolapoff

USSR/Chemistry - Blood; Effects of
Ultrasound 21 Jul 51

"Splitting of Porphyrin Rings Under the Effect of
Ultrasonic Waves," I. Ye. El'piner, L. A.
Blyumensfel'd, S. E. Krasovitskaya, Gen Inst of
Advanced Trng of Physicians, Min of Pub Health
USSR; Lab of Cancer Biochem, Acad Med Sci USSR

"Dok Ak Nauk SSSR" Vol LXXIX, No 3, pp 495-497

Under action of ultrasonic waves in air the splitting
of hemin is slow. With sufficiently powerful ultra-
sonic waves, the breaking up of hemin proceeds up

211T25

to the appearance of pyrroles, but no noticeable
formation of bile pigments could be observed. It
is concluded that the iron atom apparently plays
the role of a factor which creates a high deg of
stability of the porphyrin nucleus. Data obtained
can be used for evaluating effect of oxygen: in
H₂ atm, splitting of porphyrin by ultrasound does
not occur.

211T25

BLYUMENFEL'D, I. A.

11-5

CA

The rate of transhemation reaction in blood hemoglobin of various regions of the circulation under normal conditions. S. E. Krasovitskaya, L. A. Blyumenfel'd and A. M. Charnyi (Ministry Health, Moscow). *Doklady Akad. Nauk S.S.S.R.* 63, 171-3 (1962). -- The transhemation reaction (cf. C.A. 43, 6855, 4378c) was checked in dogs with oxymyoglobin taken from various circulation points. The test is best done at pH 5.3-5.6. The oxymyoglobin

sample was dissolved in 2% gelatin in phosphate buffer at 38.0°, best at 2.5×10^{-4} M concn. The rate was followed spectrographically (abs. at 414 mμ). The results are shown graphically. No differences between various specimens were found in specimens taken from the femoral arteries; in some cases the reaction was more rapid with specimens taken from the blood leaving the brain area. Possibly this is a manifestation of protective mechanism aiding the stability of O supply. (I. M. Kozlovskii).

KR/ SOVITSKAYA, S.Ye.; BLYUMENFEL'D, L.A.; CHARNYI, A.M.

Effect of narcosis on the stability of coupling of heme with globin.
Doklady Akad. nauk SSSR 83 no.2:325-326 11 Mar 1952. (GML 22:1)

1. Presented by Academician A. I. Oparin, 31 December 1951. 2. Central
Institute for the Advanced Training of Physicians.

BIYUMENFEL'D, L.A.

Chemical structure of hemoglobin and mechanism of reaction of reverse addition of oxygen. Doklady Akad nauk SSSR 85 no. 5:1111-1114 11 Aug 1952. (GIML 23:3)

1. Presented by Academician A. N. Terenin 11 June 1952. 2. Central Institute for the Advanced Training of Physicians, Ministry of Public Health USSR.

BLYUMENFEL'D, L.A.; KRASOVITSKAYA, S.E.; MOSHKOVSKIY, Sh. D.

Action of bigumal (1-p-chlorophenyl-5-isopropylbiguanide) on the functional state of hemoglobin. Doklady Akad. Nauk S.S.S.R. 88, 531-3 '53. (MLRA 6:1) (CA 47 no.14:7103 '53)

1. Ministry Health, Moscow.

Cent. Inst. Advanced Training of Physicians

BLYUMENFELD, L. A.

Chem abo V48

1-25-54

Pathology

Characterization test of epileptiform state phases by means of the transhemation reaction. L. A. Blyumenfeld, A. O. Dolin, S. E. Krasovitskaya, T. P. Kolich, and A. M. Charnyi (Ministry Health, Moscow). *Doklady Akad. Nauk S.S.S.R.* 92, 189-91(1953).—The rate of the transhemation reaction reflects the phases of the epileptic state. Preconvulsion state reduces the rate of transhemation, a change that becomes evident immediately upon introduction of camphor. The retardation is then replaced with a constantly increasing rate of transhemation. If the convulsions are feeble, the latter phase is not apparent. The postconvulsive state is characterized by gradual retardation of transhemation. The expts. were run on rabbits, and the transhemation reaction was run as described earlier (*C.A.* 46, 7637i). G. M. Kosolapoff

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BLYUMENFEL'D, L. A.

Dissertation: "Chemical Structure of Hemoglobin and the Mechanism of the Reversible Addition of Oxygen." Dr. Chem Sci, Inst of Chemical Physics, Acad Sci USSR, 16 Apr 54. (Vechernyaya Moskva, Moscow, 6 Apr 54)

SO: SUM 243, 19 Apr 54

BLUMENFELD, L. A.

USSR/Medicine - Physiology

Card 1/1 Pub. 22 - 50/50

Authors : Grashchenkov, N. I., Memb. Corresp. Acad. of Sc., USSR.; Blumenfeld, L. A.,
Drasovitskaya, S. E.; Perel'man, L. B.; and Smirnov, Yu. K.

Title : Oxygen consumption by tissues and functional state of hemoglobin during
myasthenia

Periodical : Dok. AN SSSR 100/1, 191-192, Jan. 1, 1955

Abstract : An investigation was conducted to determine the effect of oxygen require-
ment of tissues on the functional state of hemoglobin during myasthenia.
A thorough diagnosis of five myasthenic patients showed that hemoglobin
plays a very important role in the regulation of the respiratory functions
of the blood. It was established that myasthenia disturbs the trophic
functions of the tissues which is expressed by reduced intensity of
tissue respiration. Five USSR references (1946-1953). Table.

Institution :

Presented by: July 14, 1954

BLYUMENFELD, L. A.

USSR/ Chemistry - Conversion processes

Card 1/1 Pub. 22 - 26/47

Authors : Shnol', S. E.; Syrkin, Ya. K., Memb. Corresp., Acad. of Sc., USSR; Yakerson, V. I.; and Blyumenfeld, L. A.

Title : Conversions of alpha-naphthalinsulfonic acid into beta-naphthalinsulfonic acid

Periodical : Dok. AN SSSR 101/6, 1075 - 1078, Apr. 21, 1955

Abstract : The mechanism of conversion of alpha-naphthalinsulfonic acid into beta-naphthalinsulfonic acid was established by the marked atom method in combination with the paper chromatography and spectrophotometry methods. The absence of radioactivity in the calcium sulfate deposition used in liberating the radioactive sulfate, served as proof of perfect purity of the converted compound. The effect of temperature on the conversion process and the final results are discussed. One USSR reference (1944-1950). Table; diagram.

Institution : The M. V. Lomonosov Inst. of Prec. Chem. Techn., Moscow

Submitted : December 1, 1954

БЛЮМЕНФЕЛД, Л.А.
БЛЮМЕНФЕЛД, Лев Александрович; CHEREDNICHENKO, V.M., редактор;
GOL'TSMAN, O.G., редактор izdatel'stva; GAMZAYEVA, M.S., tekhnicheskiy
redaktor.

[Hemoglobin and its reversible union with oxygen] · Gemoglobin i
obratimoe prisoedinenie kisloroda. Moskva, Gos.izd-vo "Sovetskaya
nauka," 1957. 138 p. (MIRA 10:11)

(HEMOGLOBIN)

BLYUMENFEL'D, L.A.

GILLAM, Albert Edward; PENTIN, Yu.A. [translator]; BLYUMENFEL'D, L.A., red.

[Electronic absorption spectroscopy in organic chemistry.
Translated from the English] Elektronnye spektry pogloshcheniia
organicheskikh soedinenii. Perevod s angliiskogo Yu.A.Pentina.
Pod red. L.A.Blyumenfel'da. Moskva, Izd-vo inostrannoi lit-ry,
1957. 386 p. (MIRA 11:4)
(Chemistry, Organic) (Absorption spectra)

BLYUMENFEL'D, L.A.

**Paramagnetic resonance spectra of biological materials and the
migration of energy. Izv.AN SSSR. Ser.biol. no.3:285-292 My-Je '57.**

(SPECTRUM ANALYSIS)

(MLRA 10:6)

(BIOLOGICAL RESEARCH)

(FORCE AND ENERGY)

BLYUMENFEL'D, L.A.

BLYUMENFEL'D, L.A.; KALMANSON, A.E.

Electronic paramagnetic resonance spectra of biological objects
[with summary in English]. Biofizika 2 no.5:552-565 '57.
(MIRA 10:11)

1. Otdeleniye biologicheskikh nauk AN SSSR, Moskva. Gruppya
chl-korr. AN SSSR N.I.Grashchenkova.
(RADIATION--PHYSIOLOGICAL EFFECT)
(SPECTRUM ANALYSIS)
(PROTEINS)

BLYUMENFEL'D L.A.

51-4-25/26

AUTHORS: Benderskiy, V. A. and Blyumenfel'd, L. A.

TITLE: Calculation of the Gradient of Electric Field in Atoms.
(Raschet gradienta elektricheskogo polya v atomakh.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.4,
pp.402-405. (USSR)

ABSTRACT: In radio-frequency spectroscopy it is necessary to find the gradient of the electric field produced by internal nuclear charges, since the quadrupole constant eQq (Q is the quadrupole electric moment of the nucleus, e is the electron charge) includes the quantity $q = \partial E / \partial z$, where E is the electric field intensity. Townes and Dailly (Ref.2) showed that q depends essentially on the field of p-electrons of the valence shell, since the effect of the filled shells and of the s-electrons of the valence band is equal to zero due to their spherical symmetry, if their polarization by p-electrons is neglected. Assuming that p_x and p_y -electrons do not alter the electric field gradient along the z-axis,

Card 1/4

51-4-25/26

Calculation of the Gradient of Electric Field in Atoms.

(q_{polar}) are given in Table 2. These contributions decrease quickly for lower periods, showing that corrections for polarization are necessary only for atoms of the fourth to seventh periods. Taking q_{polar} into account the values of q for atoms of the fourth period are calculated and are given in the first row of the unnumbered table at the bottom of p.404. The second row in that table gives the experimental values. The agreement between the experiment and calculation is now the same for the fourth period as that obtained earlier for the second and third periods. The results, although obtained by a rough approximation, indicate that calculations of sufficient accuracy may be carried out. The present work confirms the accuracy of the effective atomic charges given by Barnes and Smith (Ref.4). Since q_{polar} may reach 20-30% of the experimental value in the fourth and higher periods it is obviously necessary to take it into account in calculation of the quadripole constants of atoms as

Card 3/4

BLYUMENFEL'D, L. A.

AUTHORS: Blyumenfel'd, L. A., Kalmanson, A. E.,

20-1-18/42

TITLE: The Spectra of the Paramagnetic Resonance of the Electrons in the Case of Irradiated Native and Denaturized Albumin Substances (Spektry elektronnogo paramagnitnogo rezonansa obлучennykh nativnykh i denaturirovannykh belkov)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 1, pp. 72-74 (USSR)

ABSTRACT: First it is referred to a previous paper on the subject by an author of this paper (reference 1). According to experiments carried out previously in the deceleration of the fermentative process in the case of soft denaturation or in the case of exhausting the "substrata" no spectra of the paramagnetic resonance of the electrons are ascertained. This gives evidence of the fact that the effect observed is caused by non-paired electrons which belong to the albumin structure and not to the metal ions and other paramagnetic admixtures. The electrons in the gliding zone of the albumin molecule can also be obtained by different method, that is by means of a ionizing radiation. Therefore the authors investigated the spectra of the paramagnetic resonance of the electrons of several irradiated native and denaturized albumin preparations, amino acids and peptides. The irradiation took place by γ -rays of the Co⁶⁰ with doses of $\sim 10^{-5}$.

Card 1/3

The Spectra of the Paramagnetic Resonance of the Electrons in 20-1-18/42
the Case of Irradiated Native and Denaturized Albumin Substances.

to -10^{-7} r. The rather voluminous list of substances here irradiated is given. Not a single one of these substances showed signals of a paramagnetic electron resonance before the irradiation. After the irradiation the amino acids and peptides usually give broad, intensive signals of the paramagnetic resonance of the electrons with a microstructure characteristic for each sample. Examples are illustrated by added pictures and different particulars of the experiment results are given. All albumin substances and "lyophilized" (лиофилизоват') tissues after the irradiation gave weak, narrow lines of the paramagnetic resonance of the electrons without microstructure. The number of free radicals produced in the irradiation increases by 100 to 500 times together with a preceding denaturation. The here discussed effects can be explained by the fact that in the thermal denaturation the secondary structure of the albumin molecules is destroyed. Instead of the long chains of hydrogen-peptide-compounds then chaotically arranged hydrogen-compounds develop. The data obtained by the authors give evidence of the existence of an electron-conduction in the native albumin molecules which conditioned by a network of hydrogen-compounds.

Card 2/3

The Spectra of the Paramagnetic Resonance of the Electrons in 20-1-18/42
the Case of Irradiated Native and Denaturized Albumin Substances.

ASSOCIATION: The Group of the Corresponding Member of the AN SSSR N.I. Gra-
shchenkov at the Department for Biological Sciences of the AN
SSSR (Gruppa dhlenn-korrespondenta AN SSSR N.I. Grashchenkova
pri Otdelenii biologicheskikh nauk Akademii nauk SSSR)

PRESENTED: July 15, 1957 by A.F. Ioffe, Academician

SUBMITTED: July 13, 1957

AVAILABLE: Library of Congress

Card 3/3

✓
BLUMENFELD, L. A. and KALMANSON, A. E.

"Spectra of Electronic Paramagnetic Resonance of Irradiated Amino Acids, Peptides, Proteins and Lyophilized Tissues, and the Mechanism of Primary Action of Ionizing Radiation on Biological Objects."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

L. A.

KASHNIKOV, V.V.; VOYTKEVICH, S.A.; BLYUMENTEL'D; BURMISTROV, M.P.

Utilization of ultraviolet absorption spectra for determining
the characteristics of odorous substances and analyzing
some two-component mixtures. Trudy VNIISNDV no. 4:130-137 '58.
(MIRA 12:5)

(Odorous substances--Analysis)
(Spectrum, Ultraviolet)

AUTHOR: Blyumenfel'd, L. A., Doctor of Chemical Sciences SOV/30-58-9-4/51

TITLE: Paramagnetic Resonance in Biology (Paramagnitnyy rezonans v biologii) Spectra of Paramagnetic Resonance of Electrons and Their Application at the Investigation of Biologic Objects (Spektry elektronnogo paramagnitnogo rezonansa i ikh primeneniye dlya issledovaniya biologicheskikh ob'yektov)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 9, pp. 22 - 29 (USSR)

ABSTRACT: This paper analyzes the principles and possibilities of the spectroscopy of paramagnetic resonance of electrons. If there appear not-compensated magnetic moments of electrons in the investigated sample a spectrum is formed. Furthermore this phenomenon is investigated and computed by following the simple example of a free electron with an intrinsic spin moment. The lines of the paramagnetic resonance of electrons may be characterized by their position, their width and their form. The exchange interaction between the unpaired electrons causes a narrowing of the spectrum. By means of the paramagnetic resonance of electrons the quantitative and qualitative detection of free radicals

Card 1/2

Paramagnetic Resonance in Biology. Spectra of SOV/30-58-9-4/51
Paramagnetic Resonance of Electrons and Their Application at the Investigation of Biologic Objects

and the investigation of the microstructure is possible. The results published by a group of American scientists (V.Commoner, J.Townsend, G.Pake)(Ref 1) are called the most interesting and most promising works. They describe the signals of the paramagnetic resonance of electrons in samples of dried and frozen animal and vegetable tissues. The results obtained by these American scientists and investigations performed by the author of this paper together with A.E.Kalmanson (Ref 2) have shown that the signals to be observed are caused by unpaired electrons in the albumen. Investigations dealing with this phenomenon are nowadays made in many countries and one may assume that they will help a lot to understand and clear up the mysterious processes which go on in living organism. There are 6 references, 3 of which are Soviet.

Card 2/2

Blyumenfeld, L.A.

BLYUMENFELD, L.A.; KALMANSON, E.A.

Electronic paramagnetic resonance spectra of biological objects;
effect of denaturation on electronic paramagnetic resonance spectra
of irradiated proteins [with summary in English]. Biofizika 3 no.1:
87-91 '58. (MIRA 11:2)

1. Otdeleniye biologicheskikh nauk AN SSSR, Moskva. Gruppy chlena-
korrespondenta AN SSSR N.I. Grashchenkova.

(NUCLEAR MAGNETIC RESONANCE) (PROTEINS)

(RADIATION--PHYSIOLOGICAL EFFECT)

(HEAT--PHYSIOLOGICAL EFFECT)

KALMANSON, A.E.; BENJUMENFEL'D, L.A.

Electron paramagnetic resonance spectra of native and denatured proteins. Biofizika 3 no.6:735 '58. (MIRA 12:1)

1. Laboratoriya anizotropnykh struktur AN SSSR, Moskva.

(PROTEINS,

spectra of paramagnetic electronic resonance of native & denaturated proteins (Rus))

5()

AUTHORS:

Berlin, A. A., Blyumenfel'd, L. A., Semenov, N. N. SOV/62-59-9-35/40

TITLE:

On Catalytic Properties of Some Macromolecular Structures

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, p 1689 (USSR)

ABSTRACT:

The anomalous magnetic properties of nucleic acids and their protein complexes, i.e. intense and wide lines in the electron paramagnetic resonance spectrum, which indicate the existence of a considerable number of odd electrons correspond to magnetic properties otherwise found only in ferromagnetic and antiferromagnetic substances. Synthetic compounds containing nitrogen and polar groups in a chain of conjugated double bonds show the same effect (Refs 2, 3). On intensifying the magnetic field these compounds exhibit a saturation effect characteristic of ferromagnetism. The cause of this behavior is seen in the existence of a shell of odd electrons enclosing the entire macromolecule, which causes these compounds to act as strong catalysts. These catalysts are particularly suitable for redox processes and reactions involving the formation of free radicals. Thus, e.g. polyaminoquinone is a catalyst for the decomposition of hydrogen peroxyde.

Card 1/2

On Catalytic Properties of Some Macromolecular Structures

SOV/62-59-9-35/40

The catalytic activity of proteins and other macromolecular substances is also the reason for their strong biochemical effect. Preliminary measurements of the magnetic susceptibility of nucleic acids and synthetic polymers were carried out by V. I. Belova at the Institute of General and Inorganic Chemistry AS USSR, and A. A. Slinkin at the Institute of Organic Chemistry AS USSR. There are 3 Soviet references.

ASSOCIATION: Laboratoriya anizotropnykh struktur Akademii nauk SSSR
(Laboratory for Anisotropic Structures of the Academy of Sciences, USSR)

SUBMITTED: June 5, 1959

Card 2/2

BUTYAGIN, P.Yu.; BERLIN, A.A.; KALMANSON, A.E.; ELYUMENFEL'D, I.A.

Formation of macroradicals in the mechanical destruction of vitrified polymers. Vysokom. soed. 1 no.6:865-868 Je '59.

(MIRA 12:10)

1. Laboratoriya anizotropnykh struktur AN SSSR.
(Polymers) (Radicals (Chemistry))

BERLIN, A.A.; BLYUMENFEL'D, L.A.; CHERKASHIN, M.I.; KALMANSON, A.E.;
SELISKAYA, O.G.

Polymers with conjugated bonds in the macromolecular chains. Part 2:
Paramagnetism and certain other properties of polyarylvinylenes.
Vysokom. soed. 1 no.9:1361-1363 S '59. (MIRA 13:3)

1. Laboratoriya anizotropnykh struktur AN SSSR.
(Polymers) (Vinylene compounds)

BLYUMENFEL'D, L.A.; BERLIN, A.A.; MATVEYEVA, N.G.; KALMANSON, A.E.

Polymers with conjugated bonds in the macromolecular chains.
Part 4: Some characteristics of polymeric compounds having
different atoms in the chain of conjugation. Vysokom.soed. 1
no.11:1647-1651 N '59. (MIRA 13:5)

1. Laboratoriya anizotropnykh struktur AN SSSR.
(Polymers)

ELYUMENFEL'D, L.A.; KRASOVITSKAYA, S.E. (Moskva)

Transhemation reaction as and indication of the functional state of hemoglobin in normal and in various pathological states. Pat.fiziol. i eksp.terap. 3 no.6:75-81 N-D '59. (MIRA 13:3)

1. Iz kafedry patologicheskoy fiziologii (zaveduyushchiy - prof. P.D. Gorizontov) Tsentral'nogo instituta usovershenstvovaniya vrachey. (HEMOGLOBIN chemistry)

SHEN PEY-GEN' [Sheng P'ei-ken]; BLYUMENFEL'D, L.A.; KALMANSON, A.E.; PASYUSKIY, A.G.

Electron paramagnetic resonance spectra of biological objects.
Report No.3: Effect of ionizing radiations on nucleic compounds.
Biofizika, 4 no.3:263-274 '59. (MIRA 12:7)

1. Laboratoriya anizotropnykh struktur AN SSSR, Moskva, i Institut
biokhimii im. A.N. Bakha AN SSSR, Moskva.

(NUCLEIC ACIDS,

eff. of radiations on electric paramagnetic resonance
spectra (Rus))

(RADIATIONS, eff.

on nucleic acid electric paramagnetic resonance spectra
(Rus))

BLYUMENFEL'D, L.A.

Anomalous magnetic properties of nucleic acids. Biofizika 4
no.5:515-520 '59. (MIRA 14:6)

1. Laboratoriya anizotropnykh struktur AN SSSR, Moskva.
(NUCLEIC ACIDS—MAGNETIC PROPERTIES)

24(7)

AUTHORS:

Blyumenfel'd, L. A., Vayevodskiy, V. V. SOV/53-68-1-4/17

TITLE:

Radio spectroscopy and the Problems of Modern
Theoretical Chemistry (Radiospektroskopiya i
problemy sovremennoy teoreticheskoy khimii)

PERIODICAL:

Uspekhi fizicheskikh nauk, 1959, Vol 68, Nr 1,
pp 31-49 (USSR)

ABSTRACT:

This article is an elaborated reproduction of a lecture held by the authors at the 12th All-Union Conference on Spectroscopy (November 1958, Moscow). It gives a survey of the investigations carried out in the USSR in the field of radio spectroscopy as well as of the most important pertinent methods and results of investigations. Radiospectroscopic investigation may be applied to the following problems: investigation of the mechanism of chemical radical- and chain reactions, polymerization, rapid reactions proceeding in liquids within less than millionths of seconds (ion interaction, charge exchange between ions, isotope exchange); processes taking place in living tissue, particularly fermentative catalysis; investigation of the structure of various materials and polymers under the action of temperature, ionizing

Card 1/3

Radiospectroscopy and the Problems of Modern
Theoretical Chemistry

SOV/53-68-1-4/17

radiation, and mechanical destruction of the chemical structure as well as the investigation of the effect exercised by ionizing radiation on biological matter. In addition, there are problems of remote action in chemical reactions, in heterogeneous catalysis and biochemical processes, explanation of the mechanism of a number of important processes, for instance, photosynthesis of organic matter from carbonic acid and water, muscular contraction, reflexibility of the nerves, further, problems of low-temperature chemistry in connection with the possibility of producing and using especially active particles which are able to carry out chemical reactions at very low temperatures. The most important and most carefully developed method of investigation is that of paramagnetic electron resonance (this phenomenon was discovered by Ye. K. Zavoyskiy in 1944; the first theory was established by Ya. A. Frenkel' (Refs 1, 2)). The methods of investigation based on the phenomenon as well as the phenomenon itself, and numerous investigations and results are mentioned and discussed. The major part of the data referred to was published in Western

Card 2/3

Radiospectroscopy and the Problems of Modern
Theoretical Chemistry

SOV/53-68-1-4/17

articles. The authors then discuss the method of nuclear magnetic resonance which in principle does not differ from the former. A more detailed description is given of line widths of solid compounds and some liquids as well as their variation during phase transitions, further, investigations of the line spectrum of magnetic resonance. Another method is that of nuclear quadrupole resonance, which is only touched. Finally, reference is made to microwave spectroscopy in gases which is applied to investigations of chemical reactions in the gas phase, especially of reactions of negligible quantities of active free radicals. Some possibilities are discussed in short. There are 5 figures and 48 references, 20 of which are Soviet.

Card 3/3

24(0).

AUTHORS:

Blyumenfel'd, L. A., Kalmanson, A. E., SOV/20-124-5-52/62
Sheng P'ei-ken

TITLE:

On the Characteristic Features of the Electron Structure of Nucleic Acids and Their Complexes With Proteins (Ob oso-bennostyakh elektronnoy struktury nukleinovyykh kislot i ikh kompleksov s belkami)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 5, pp 1144-1146 (USSR)

ABSTRACT:

The authors continue their investigation of the spectra of electronic paramagnetic resonance (EPR) of unpaired electrons which can be observed in biological objects in the course of fermentative reactions and in consequence of γ irradiation (Refs 1-5). In the present paper a new class of biological objects was used for this purpose. In the EPR spectra of ribonucleic acid (RNA) and deoxyribonucleic acid (DNA) EPR lines of large width and integral intensity were observed. Badly depolymerized preparations (of the Schwartz works) gave no signal. The results obtained show that in native nucleic acids and especially in their complexes with proteins huge amounts of unpaired electrons strongly interacting with

Card 1/3

On the Characteristic Features of the Electron SOV/20-124-5-52/62
Structure of Nucleic Acids and Their Complexes With Proteins

each other are present at normal temperatures. Their number lags only little behind that of free electrons in metals. This electron cloud is bound to give completely new properties to such structures. It must be taken into consideration that in this case all similarities with metals, ferromagnetics, and antiferromagnetics have to be regarded as somewhat limited. This is an effect which is localized within each macromolecule. The EPR lines recall as to their shape the spectra of conductivity electrons in metals. Apparently there exists no Fermi level in the case mentioned and all unpaired electrons participate in magnetization. This is apparently a completely new phenomenon. It is impossible to predict the physical and chemical properties of such systems because of the lack of similarities. The fact itself that a huge cloud of unpaired electrons is observed in polymeric molecules which, on the whole, contain only C, N, H, and P atoms is most astonishing and cannot yet be explained. The authors are convinced that the phenomenon they discovered plays an important part in the specific properties of the biological structures (directed synthesis, inheritance of hereditary characteristics,

Card 2/3

On the Characteristic Features of the Electron Structure of Nucleic Acids and Their Complexes With Proteins SOV/20-124-5-52/62

synthesis of immune-specific proteins, memory)(Refs 6,7).
N. N. Semenov, Academician, and V. V. Voyevodskiy, Corresponding Member, AS USSR took part in the discussion of the results. There are 2 figures and 7 references, 5 of which are Soviet.

ASSOCIATION: Laboratoriya anizotropnykh struktur Akademii nauk SSSR
(Laboratory for Anisotropic Structures of the Academy of Sciences, USSR)

PRESENTED: January 28, 1959, by N. N. Semenov, Academician

SUBMITTED: January 27, 1959

Card 3/3

BLYUMENFELD, L. A.

23

PHASE I BOOK EXPLOITATION SOV/5628

Akademiya nauk SSSR. Institut biologicheskoy fiziki

Rol' perekisey i kisloroda v nachal'nykh stadiyakh radiobiologicheskogo effekta (Role of Peroxides and Oxygen During Primary Stages of Radiobiological Effects) Moscow, 1960. 157 p. 4,500 copies printed.

Responsible Ed.: A. M. Kuzin, Professor; Ed. of Publishing House: K. S. Trincher; Tech. Ed.: P. S. Kashina.

PURPOSE: This collection of articles is intended for scientists in radiobiology and biophysics.

COVERAGE: Reports in the collection deal with the role of peroxides and oxygen in the primary stages of a radiobiological effect. They were presented and discussed at a symposium held December 25-30, 1958, organized by the Institut biofiziki AN SSSR, (Institute of Biophysics, AS USSR). Twenty-eight Moscow scientists, radiobiologists, radiochemists, physicists, and physical chemists took an active part in the symposium. Between the time of its conclusion and the publication of the present book some of the materials were expanded. In addition to the authors the following scientists participated in the discussion: L. A. Tummler, V. S. Tongur, G. M. Frank, Yu. A. Kriger, E. Ya. Grayevskiy, N. N. Demin, B. N. Tarusov, and I. V. Vereshchenskiy. References follow individual articles.

Blyumenfel'd, L. A. [Institut Khimicheskoy fiziki AN SSSR - Institute of Chemical Physics, AS USSR]. Problem of Identification of Free Radicals by the Electron Paramagnetic Resonance Method

97

BLYUMENFEL'D, L.A.; BERLIN, A.A.; SLINKIN, A.A.; KALMANSON, A.E.

New magnetic properties of macromolecular compounds having conjugated double bonds. Zhur. strukt. khim. 1 no.1:103-108 My-Je '60.
(MIRA 13:8)

1. Institut khimicheskoy fiziki AN SSSR.
(Macromolecular compounds--Magnetic properties)

8702

11.22/0

APPROVED:

8/190/40/003/006/007/012

2015/0064

Yakovlev, Z. S., Malinitskiy, Yu. M., Karpov, V. L.,
Chernov, A. A., Mironov, V. A.

Chemical Change of Polymethylchloride Under the Influence
of Ionizing Radiation

YAKOVLEV, Z. S., MALINITSKIY, YU. M., KARPOV, V. L.,
 CHERNOV, A. A., MIRONOV, V. A.

1960, Vol. 2, No. 6,
 pp. 891-898

TEXT: The present paper investigates the dependence with time of the color change of PTC irradiated by γ rays. The irradiation was carried out in a vacuum chamber. The samples, brought about by irradiation were also irradiated. PTC powder samples and films (40, 180, and 200 μ thick) were irradiated at 291K and 77K in vacuum (approximately 10^{-4} torr), and stored in vacuum or in the air. Irradiations was made with fast neutrons with an energy of 200 kev, with a current density of 0.64 a/cm^2 being applied to the samples provided for determining the absorption spectrum (on the CG-457-4) spectrometer) and paramagnetic electron resonance, and for determining the infrared spectra $1.7 \mu\text{m/cm}^2$ in Card 1/5

electron accelerator with attracted beam was used as electron source. L. A. Vasiliyev irradiated the samples. In the infrared spectrum of the non-irradiated PTC (Fig. 1) a strong absorption band lies at 1256 cm^{-1} for the $-\text{CHCl}-$ group (Ref. 8), at 1428 cm^{-1} for the deformation oscillations of the methylene group (Ref. 9), and at 1390 cm^{-1} for the CH group (Ref. 9), at 1097 cm^{-1} for the C-Cl bond of the carbon chain, at 960 cm^{-1} for the methylene group and the C-Cl bond of the carbon skeleton, as well as at 808 cm^{-1} for the C-Cl bond. The intensity of the 1256 cm^{-1} and 960 cm^{-1} bands is reduced in the spectrum of PTC irradiated in vacuum at room temperature for 3 hours. This indicates a reduction in the deformation oscillations of the methylene group. The 1428 cm^{-1} band indicates a reduction in the deformation oscillations of the methylene group. In this case, indicating a reduction in the amount of methylene groups. In this case, indicating conjugate double bonds are formed under the separation of HCl (new band in the range of $1720-1550 \text{ cm}^{-1}$). The further results obtained by spectral analyses and paramagnetic electron resonance indicate that the color change of PTC is due to processes occurring under the participation of radicals. By the method of the paramagnetic electron resonance the concentration of the radicals was found to decrease with time. In vacuum, this decrease is apparently due to a recombination of the radicals, and in the presence of air oxygen to a reaction of the latter with the free radicals under the formation of peroxide radicals. The vanishing of the free radicals is accelerated on heating, with chromophores (very likely with polyene character) being formed, intensifying the color of PTC. The infrared spectra were recorded with a device of the firm Khil'per, model 109. There are 7 figures and 11 references: 5 Soviet, 5 US, and 1 French.

ASSOCIATION: Physicochemical Institute in L. Ye. Kuper. (Physics-Chemical Institute of the USSR Academy of Sciences, Leningrad)
 TRANSLATION: L. A. Vasiliyev (Institute of Chemical Physics of the AS USSR)

SUMMARY: February 22, 1960

Card 2/5

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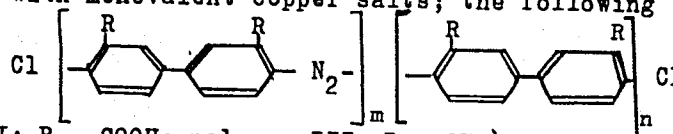
S/190/60/002/010/009/026
B004/B054

AUTHORS: Liogon'kiy, B. I., Lyubchenko, L. S., Berlin, A. A.,
Blyumenfel'd, L. A., and Parini, V. P.

TITLE: Polymers With Conjugate Bonds and Heteroatoms in the Con-
junction Chain. XI. The Spectra of Electron Paramagnetic
Resonance of Linear Aromatic Polymers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 10,
pp. 1494-1499

TEXT: In previous papers (Refs. 1, 2), the authors obtained aromatic
polymers by reaction of bis-diazotized benzidine, benzidine-3,3'-dicarb-
oxylic acid, and o-toluidine with monovalent copper salts; the following
structural formula is given:



(polymer I: R = H; polymer II: R = COOH; polymer III: R = CH₃). The
electron paramagnetic spectra (epr) were taken (Figs. 1-3) of these poly-
Card 1/2

Polymers With Conjugate Bonds and Heterostoms in the Conjunction Chain. XI. The Spectra of Electron Paramagnetic Resonance of Linear Aromatic Polymers S/190/60/002/010/009/026 B004/B054

mers and the copolymer from I and p-diethinyl benzene, and the concentration of the nonpaired electrons was found to be $10^{18} - 10^{19}$ in 1 g of substance (Table) by comparison with the epr spectrum of diphenyl-picrylhydracyl as a standard. All epr spectra showed a signal with g-factor 2.00 which remains unchanged on heating to 300-350°C and cooling to 77°K, and is interpreted as a signal of the conjugate bonds. The broader epr signal, which is superposed to this signal in unheated samples, could not be analyzed because of the superposition, and is interpreted as a signal of less active, free radicals with localized free valency. The signal appearing additionally in the insoluble fraction with g-factor 2.05, which disappears on dissolution, is ascribed to low-molecular particles. The stability of the epr spectrum in the wide temperature range indicates the paramagnetic character of at least part of the polymer. There are 3 figures, 1 table, and 9 references: 8 Soviet and 1 US.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics of the AS USSR)

SUBMITTED: April 25, 1960

Card 2/2

MOROZOVA, G.K.; ~~BLYUMENFEL'D, L.A.~~

Effect of oxygen on electron paramagnetic resonance of
lyophilized tissues. Biofizika 5 no. 2:235-238 '60.

(MIRA 14:4)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

(OXYGEN—PHYSIOLOGICAL EFFECT) (PARAMAGNETIC RESONANCE AND RELAXATION)
(TISSUES)

VOZVYSHAYEVA, L.V.; BLYUMENFEL'D, L.A.

Effect of ionized side groups on magnetic properties of
ribonucleic acid. Biofizika 5 no. 5:579-581 '60. (MIRA 13:10)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.
(NUCLEIC ACIDS--MAGNETIC PROPERTIES)
(RADIATION--PHYSIOLOGICAL EFFECT)

SHEN PEY-GEN' [Shêng P'ei-Kên]; BLYUMENFEL'D, L.A.; KALMANSON, A.E.

Effect of denaturation and complex formation with proteins on
the magnetic properties of nucleic acids. Biofizika 5 no. 6:645-
654 1960. (MIRA 13:10)

1. Institut khimicheskoy fiziki AN SSSR, Moskva i Institut
biokhimii im. A.N. Bakha AN SSSR, Moskva.
(NUCLEIC ACIDS--MAGNETIC PROPERTIES)

S/051/60/009/006/014/018
E201/E191

AUTHORS: Chernyakovskiy, F.P., Kalmanson, A.E., and
Blyumenfel'd, L.A.

TITLE: Electron Paramagnetic Resonance ^γ in Crystals of
Triphenylmethane Dyes _✓

PERIODICAL: Optika i spektroskopiya, 1960, Vol.9, No.6, pp 786-787

TEXT: The author recorded the electron spin resonance spectra of crystal violet, basic brilliant green, malachite green, fuchsin (basic and acidic forms), fluorescein (uranin), rhodamines, thymol- and phenolphthaleins, indigo carmine and Congo red. With the exception of colourless phthaleins, coloured potassium thymolphthalein and malachite green, all the spectra were sharp singlets without hyperfine structure. Examples of such singlets are given in a figure on p. 787, where curve a represents the spectrum of crystal violet and curve 6 represents basic brilliant green. Experiments with water--alcohol solutions of indigo carmine and crystal violet showed that the electron spin resonance signal disappeared on dissolution and reappeared on drying. There are 1 figure and 5 Soviet references. ✓

SUBMITTED: June 6, 1960
Card 1/1

BLYUMENFEL'D, L.A.; ERMINSKIY, V.A.

Magnetic and dielectric properties of highly-organized
macromolecular structures. Dokl.AN SSSR 133 no.6:
1451-1454 Ag '60. (MIRA 13:8)

1. Institut khimicheskoy fiziki Akademii nauk SSSR.
Predstavleno akad. N.N.Semenovym.
(Polymers--Magnetic properties)
(Polymers--Electric properties)

15.8000 2209, 2109 only

87414

24.7900 1144, 1160 only

S/020/60/135/006/032/037
B004/B056

AUTHORS: Tal'roze, V. L. and Blyumenfel'd, L. A.

TITLE: The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1450 - 1452

TEXT: The authors discuss published data according to which in polymers with a well-developed system of conjugate double bonds, narrow, symmetric lines of electron paramagnetic resonance (epr) appear (width 4-8 oe), whereas some of such polymers containing hetero-atoms, electron donor and electron acceptor groups, have broad (500 - 1000 oe) asymmetric epr lines. Numerous polymers were investigated; for the latter Fig.1 shows $E = f(\log \sigma_0)$. E is the activation energy, σ_0 is the factor of the exponential function of conductivity, + denotes the substances, which show narrow epr lines, and . denotes such substances with broad epr lines. All

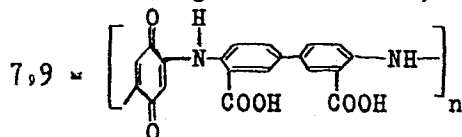
Card 1/8 5

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The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra

S/020/60/135/006/032/037
B004/B056

substances with broad epr lines have increased conductivity at room temperature. For substances with narrow epr lines there exists a linear relation between E and $\log \sigma_0$. There exists not only a correlation between conductivity and the appearance of the epr spectra of the conjugate system, but, above all, a correlation between the pseudoferromagnetic properties of the organic structure and its conductivity. Substances with broad epr lines are assumed to have large ordered regions with a large number of unpaired electrons, and the motion of charge in these regions occurs nearly without any resistance. The numbers of Fig.1 correspond to the following substances: 1,2 = polyphenylacetylene;

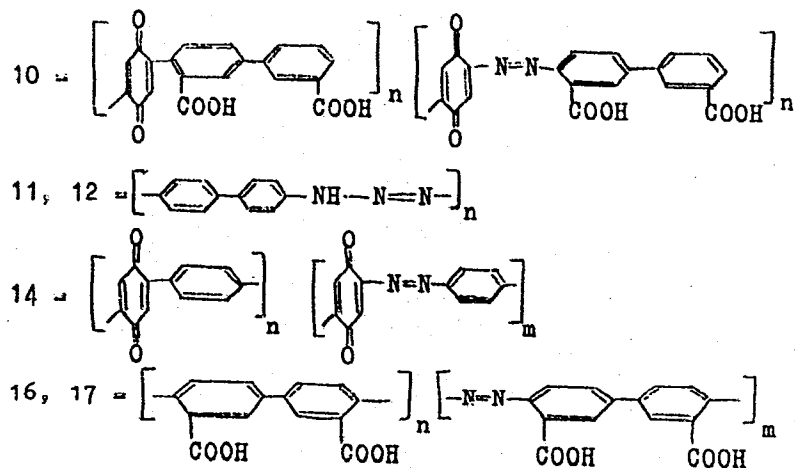


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8/414

The Interrelation Between the Electrical
Conductivity of Organic Substances With
Conjugate Bonds and Their Electron Magnetic Resonance Spectra

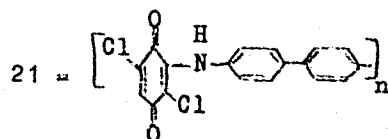
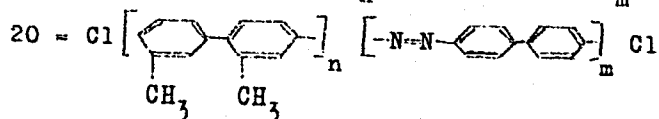
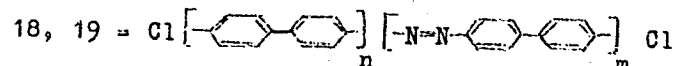
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B004/B056



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The Interrelation Between the Electrical
Conductivity of Organic Substances With
Conjugate Bonds and Their Electron Magnetic Resonance Spectra

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B004/B056



22 = complex of 21 with copper acetate; 26 = complex of tetrasalicyl
ferrocene with Fe^{2+} ; 29 = copolymer from polyphenylacetylene and hexyne;
31 = polytetracyanoacetylene; 32 = polytetracyanoacetylene with cyano-
ethylene; 34, 35 = polyphenylacetylene; 36 = copolymer from polyphenyl-
acetylene and p-diethynyl benzene; 37, 39 = complex of acenaphthene with

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The Interrelation Between the Electrical Conductivity of Organic Substances With Conjugate Bonds and Their Electron Magnetic Resonance Spectra S/020/60/135/006/032/037
B004/B056

chloranil; 74 = polyphenylene. There are 1 figure and 10 references:
7 Soviet, 1 US, 1 British, and 1 Australian.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute
of Chemical Physics of the AS USSR)

PRESENTED: June 25, 1960, by N. N. Semenov, Academician

SUBMITTED: June 23, 1960

Card 5/5

CHARNY, Abram Markovich[deceased]; BLYUMENFEL'D, L.A.; KRASOVITSKAYA, S.E.; USPENSKIY, V.I.; GORIZONTOV, P.D., prof., red.; RAYSKINA, M.Ye., red.; BEL'CHIKOVA, Yu.S., tekhn. red.

[Pathophysiology of hypoxic conditions] Patofiziologiya gipoksicheskikh sostoyaniy. 2.izd., posmertno perer. Pod obshchei red.P.D.Gorizontova. Moskva, Medgiz,1961. 342 p. (MIRA 15:7)

1. Chlen-korrespondent Akademii meditsinskikh nauk SSSR (for Gorizontov).

(ANOXEMIA) (OXYGEN—THERAPEUTIC USE)

BLYUMENFELD, L. A.

"Magnetic and Dielectric Properties of Nucleic Acids and Nucleoproteins and their Interpretation."

report presented at the Colloquium of the Royal Academy of Belgium on Applications to Biochemistry and Chemical Structure from the Spectroscopy of Radio Frequencies, Brussels, 6-7 Apr 1961.

89687

5-4100 1043, 1087, 1160

S/026/61/000/002/002/003
A166/A027

AUTHOR: Blyumenfel'd, L.A., Doctor of Chemical Sciences

TITLE: The Magnetic and Electrical Properties of Macromolecules

PERIODICAL: Priroda, 1961, No. 2, pp. 55-59

TEXT: The Laboratoriya fizicheskoy khimii biopolimerov Instituta khimicheskoy fiziki Akademii nauk SSSR (Laboratory of the Physical Chemistry of Biopolymers, Institute of Chemical Physics, Academy of Sciences USSR), during studies of the effects of radiation on protein substances, discovered in 1958 that ribonucleic acid and nucleoproteids exhibited a wide paramagnetic resonance signal. The same phenomenon was present in unirradiated specimens, indicating that it was a specific property of such substances. Some characteristics of the signals were reminiscent of the properties of antiferromagnetics, but differed in that the magnetization curve was marked by saturation in comparatively weak magnetic waves. They further differed from ferromagnetic materials in that they retained no residual magnetization once the magnetic field was switched off. These new properties have been provisionally named "pseudoferrromagnetism".
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S/026/61/000/002/002/003
A166/A027

The Magnetic and Electrical Properties of Macromolecules

The new effect proved to be purely structural. Destruction of the natural ordered structure of nucleic acids or nucleoproteids by heat in solution or by the action of hydrochloric acid led to a reduction in the pseudoferrromagnetic effect. It was further found that pseudoferrromagnetism only appeared at a definite structure of the material under study. Similar magnetic properties were also detected in synthetic polymers of a certain structure, whereby the decisive factor was the macromolecular structure. The author and V.A. Benderskiy attempted to find the theoretical explanation for the phenomenon and advance the following hypothesis. If "A" is an individual monomer, a polymer molecule of $\dots A^+ \dots A^- \dots A^+ \dots A^- \dots A^+ \dots A^- \dots A^+$ presents a structure where each center has one unpaired electron. The collective interaction of the magnetic moments of the unpaired electrons in a magnetic field could then lead to the pseudoferrromagnetic effects observed at the Laboratory. The author also believes that such structures must have surprising electrical properties: high polarizability and a high dielectric constant which will depend to a large extent

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S/026/61/000/002/002/003
A166/A027

The Magnetic and Electrical Properties of Macromolecules

on the intensity of the external electric field. They will also probably have hysteresis phenomena and seignetteoelectric properties. Recently the Laboratory noted a regular change in the magnetic properties of a monocellular yeast culture during growth and cell division. It is probable that the pseudoferromagnetic properties of nucleoproteids rise sharply in the stages preceding cell division. Studies along these lines may therefore help to reveal the physical mechanism of cell division. There are 4 graphs.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AS USSR), Moscow

Card 3/3

KRASOVITSKAYA, S.E. [deceased]; BLYUMENFEL'D, L.A.; SYROVATKO, F.A.;
FALILEYEV, Yu.V.; KAN, D.V. (Moskva)

Changes in the functional conditions of hemoglobin in malignant and
benign growth in the human organisms. Pat. fiziol. i eksp. terap.
5 no.2:61-62 Mr-Apr '61. (MIRA 14:5)

1. Iz Tsentral'nogo instituta usovershenstvovaniya vrachey i
Instituta khimicheskoy fiziki AN SSSR.
(TUMORS) (HEMOGLOBIN)

SAMOYLOVA, O.P.; BLIVIMENFEL'D, L.A.

Changes in the magnetic properties of yeast cultures during the
processes of growth and cell division. Biofizika 6 no. 1:15-19
'61. (MIRA 14:2)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.
(YEAST--MAGNETIC PROPERTIES) (CELL DIVISION (BIOLOGY))

BLUMENFELD, L.A., doktor khimicheskikh nauk

Electronic paramagnetic resonance spectra of biopolymers. Zhur.
VKHO 6 no.3:319-324 '61. (MIRA 14:6)
(Polymers—Spectra) (Biochemistry)

SHEN PEY-GEN'; BLYUMENFEL'D, L.A.; KALMANSON, A.E.; PASYNSKIY, A.G.

Spectra of electronic paramagnetic resonance of biological objects. Part 4: Effect of ionizing radiations on chemically modified and denatured nucleic acid derivatives. Biofizika 6 no.5:534-547 '61. (MIRA 15:3)

1. Institut khimicheskoy fiziki AN SSSR, Moskva i Institut biokhimii imeni A.N. Bakha AN SSSR, Moskva.

(NUCLEIC ACIDS--SPECTRA)

(RADIATION--PHYSIOLOGICAL EFFECT)

(PARAMAGNETIC RESONANCE AND RELAXATION)

BLYUMENFEL'D, L.A.; BENDERSKIY, V.A.; KALMANSON, A.E.

Possibility of various interpretations of anomalous magnetic properties of macromolecular compounds. Biofizika 6 no.6:631-637 '61. (MIRA 15:1)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.
(MACROMOLECULAR COMPOUNDS—MAGNETIC PROPERTIES)

BLYUMENFEL'D, L.A., doktor khimicheskikh nauk

Problem of biomagnetism. Nauka i zhizn' 28 no.7:89-90 JI '61.
(MIRA 14:8)

1. Zaveduyushchiy laboratoriyey Instituta khimicheskoy fiziki
AN SSSR.
(BIOLOGICAL RESEARCH) (MAGNETISM—PHYSIOLOGICAL EFFECT)

PHASE I BOOK EXPLOITATION

SOV/6495

Blyumenfel'd, Lev Aleksandrovich, Vladislav Vladislavovich Vovodskiy, and
Anatoliy Grigor'yevich Semenov

Primeneniye elektronnoy paramagnitnoy rezonansy v khimii (Use of Electron
Paramagnetic Resonance in Chemistry) Novosibirsk, Izd-vo Sibirskogo
Otdeleniya AN SSSR 1962. 239 p. 10,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Sibirskoye otdeleniye. Institut
khimicheskoy kinetiki i goreniya So. AN SSSR. Institut khimicheskoy
fiziki AN SSSR.

Ed.: T. M. Nazaryants; Tech. Ed.: O. A. Lokshina.

PURPOSE: This book is intended for scientists using Electron Paramagnetic
Resonance technique in chemistry as a research tool.

COVERAGE: This advanced textbook covers the fundamentals of EPR technique in
chemical research. It is based on Soviet and non-Soviet literature and on

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2

Use of Electron Paramagnetic (Cont.)

SOV/6495

the work of the authors. The first part of the book discusses questions of experimental technique, theory of the method, and analysis of experimental data and the principles of building EPR spectrometers, particularly the serial-type EPR-2 spectrometer used in the USSR. The modern theory of EPR method and the theoretical physics involved, i.e. group theory, quantum mechanics, etc., are presented. The second part of the book deals with the application of EPR technique in solving a series of problems in modern chemical reactions and the study of intermediate compounds and elemental processes. This book is not a complete review of the field, but is restricted to the illustration of concrete examples based on the authors' contributions in this field and to conclusions generalized from these works. The book reportedly does not overlap the existing monographs on EPR. There are 309 references, 121 Soviet and 188 non-Soviet.

TABLE OF CONTENTS [Abridged]:

Preface

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2

BLYUMENFELD, L.A.

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5/190/62/004/001/010/020
B101/B110

AUTHORS: Yegorova, Z. S., Malinskiy, Yu. M., Karpov, V. L., Kalmanson, A. E., Blyumenfel'd, L. A.

TITLE: Kinetics of disappearance of free radicals in irradiated polyvinyl chloride

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 1, 1962, 64 - 65

TEXT: The authors studied the decrease of concentration of free radicals in irradiated polyvinyl chloride in vacuo at 70 - 100°C by means of epr.

Degassed polyvinyl chloride powder was irradiated with 200-kev electrons ($0.6 \mu\text{A}/\text{cm}^2$) for 10 min in vacuo (about 10^{-4} mm Hg) at 77° K. The epr signal was recorded by the apparatus of A. G. Semenov, N. N. Bubnov (Pri-bory i tekhnika eksperimenta, 1, 92, 1959) and compared with that of the standard diphenyl picryl hydrazyl. X

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Kinetics of disappearance of ...

3215
5/190/62/004/001/010/020
B101/B110

Results:

Temperature, °C	70	80	90	100
$(1/T) \cdot 10^3$	2.92	2.83	2.76	2.68
$k \cdot 10^{22}$	0.06	0.28	2.76	8.04

T = absolute temperature, k = constant of the rate of disappearance of radicals (number of paramagnetic particles⁻¹·g·sec⁻¹). The function $\log k = f(1/T)$ is linear (second-order reaction). In the temperature range studied, the activation energy of recombination was 44±5 kcal/mole. There are 2 figures and 4 references: 2 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: A. A. Miller, J. Phys. Chem., 63, 1755, 1959; Z. Kuri, H. Ueda, S. Shida, J. Chem. Phys., 32, 371, 1960.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov). Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

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S/190/62/004/008/016/016
B117/B144

AUTHORS: Tal'roze, V. L., Blyumenfel'd, L. A.

TITLE: Report by A. V. Ayrapetyants, R. M. Voytenko, B. E. Davydov,
and V. S. Serebryanikov

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 8, 1962, 1282

TEXT: The scientists mentioned in the title published a paper (Vysokomolek. soyed., 3, 1876, 1961) on the absence of a compensation effect in differently treated polyacrylonitrile samples. They stated that the absence of this effect contradicts the results obtained by the authors of the present paper (Dokl. AN SSSR, 135, 1450, 1960). Here there would seem to be a misunderstanding, for the above-mentioned paper contained the following information: The polymers studied, especially those with conjugate bonds, may be divided into two groups: (1) substances with insulating properties at room temperature ($\rho_{208} = 10^{13} - 10^{16} \text{ ohm}\cdot\text{cm}$) and a distinct compensation effect; (2) polymer semiconductors with an electric conductivity of $10^{-5} - 10^{-10} \text{ ohm}^{-1}\cdot\text{cm}^{-1}$ at 20°C which had no

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✓

Report by A. V. Ayrapetyants...

S/190/62/004/008/016/016
B117/B144

compensation effect. Hence the results of the two papers are consistent.

SUBMITTED: February 5, 1961

Card 2/2

VOYEVODSKIY, V.V.; BLYUMENFEL'D, L.A., doktor khimicheskikh nauk

Weak interactions in organic chemistry. Zhur. VKHO 7 no.4:
457-461 '62. (MIRA 15:8)

1. Chlen-korrespondent AN SSSR.
(Chemistry, Organic)

LYSTSOV, V.N.; SUKHORUKOV, B.I.; BLYUMENFEL'D, L.A.; MOSHKOVSKIY, Yu.Sh.;
PETUKHOV, V.A.

Spectroscopic study of deoxyribonucleic acid in the absorption
band of 200 millimicrons. Biofizika 7 no.6:662-663 '62.

(MIRA 17)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

BLYUMENFEL'D, L.A.; TEMKIN, M.I.

Possible mechanism of the formation of adenosinetriphos-
phoric acid in the course of oxidative phosphorylation.
Biofizika 7 no.6:731-733 '62. (MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR, Moskva i Fiziko-
khimicheskiy institut im. L.Ya. Karpova, Moskva.

150040
 S/020/62/144/004/017/024
 B101/B138
 AUTHORS: Benderskiy, V. A., and Blyumenfel'd, L. A.
 TITLE: States involving charge transfer in organic systems
 PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 4, 1962, 813-816

TEXT: A hypothesis is developed regarding the magnetic and electrical properties of organic polymers with conjugate bonds, crystals of low-molecular compounds which have such bonds, and donor-acceptor crystals made up of two components. The local states which determine these properties involve charge transfer either between molecules or between conjugate sections of a molecule. Following L. E. Lyons (J. Chem. Soc., 1957, 5001) it is assumed that carriers are formed by dissociation of charge transfer complexes (CTC). The determination of the dissociation energy E_d of the local state involving charge transfer and the formation of a central ion at the defect and of a free carrier can be reduced to determining the polarization energy E of the crystal with the aid of quantum-field theory. The motion of the electron was found to be accompanied by an adiabatic wave of electronic polarization which

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States involving charge transfer ...

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B101/B138

diminishes the self-energy of the conduction electron. The polarization energy E of the crystal is represented by: $E = (-DK_{nn}/v_o) \sum_i (f_i/\epsilon_i^2)$,

where D = a numerical coefficient depending on the shape of the crystal, v_o = volume of a molecule in the crystal, K_{nn} = integral of Coulomb interaction between two electrons in the uppermost occupied molecular orbit, f_i = oscillator strengths, and ϵ_i = energy of the excited states.

E_d of the polar states is given by $E_d = -[1 - (2D/v_o) \sum_i (f_i/\epsilon_i^2)] W(R_o^i)$, where $W(R_o^i)$

= energy of Coulomb interaction in the polar state. Calculations of E and E_d for aromatic hydrocarbons gave respectively (in ev): 1.08 and

1.47 for naphthalene; 1.39 and 1.08 for anthracene; 1.76 and 0.78 for naphthacene; 1.95 and 0.48 for pentacene. On the basis of this model

of local centers with charge transfer, an additional formation of carriers is possible if CTC are dissociated by excitons (Fig. 2). The carrier concentration is given by $p = N_o \exp(-\epsilon_u/2kT) + n \exp(-E_d/2kT)$

+ $\gamma [N_o/1 + W_1/W_2] \exp(-\epsilon_o/2kT)$, where N_o = concentration of the pairs; Card 2/3.

States involving charge transfer ...

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B101/B138

W_1 and W_2 = probability of deactivation and decay of excitons, respectively, $\gamma \approx 1$; ϵ_0 = singlet-singlet transfer energy. There are 2 figures.

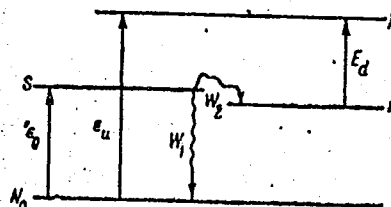
ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR
(Institute of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: January 8, 1962, by V. N. Kondrat'yev, Academician

SUBMITTED: December 30, 1961

Fig. 2. Diagram showing model of an organic semiconductor.

p = conduction band; n = local level caused by CTC; S = exciton singlet band.



Card 3/3

SUKHORUKOV, V.; POLTEV, V.; ELYUMENFELD, L.A.

"Transfer of protons between bases of DNA."

Report presented at the Symposium for Physical Chemistry of Biogenic
Macromolecules, Jena, GDR, 18-21 Sep 63.

SHUSTOROVICH, Yevgeniy Meyerovich; KABACHNIK, M.I., akademik,
otv. red.; BLYUMENFEL'D, L.A., doktor khim. nauk, otv.
red.; KORDYUKOVA, S.A., red.; TARASENKO, V.M., red. izd-va;
SUSHKOVA, L.A., tekhn. red.

[Nature of chemical bonds] Priroda khimicheskoi svyazi.
Moskva, Izd-vo AN SSSR, 1963. 134 p. (MIRA 16:12)
(Chemical bonds)

BLYUMENFEL'D, L.A.; BENDERSKIY, V.A.

States with charge transfer in organic systems. Part 1. Zhur.-
strukt.khim. 4 no.3:405-414 My-Je '63. (MIRA 16:6)

1. Institut khimicheskoy fiziki AN SSSR.
(Aromatic compounds) (Electrons) (Crystals--Electromagnetic properties)

S/020/63/148/002/030/037
B189/B101AUTHOR: Blyumenfel'd L. A.

TITLE: On the ferromagnetism of organic structures

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148. no. 2, 1963, 361 - 364

TEXT: It was sought to find out whether the ferromagnetism observed in some organic structures is a property of the high-molecular structures or due to the action of small amounts of ferromagnetic impurities. The ferromagnetic resonance curves and the magnetization curves of desoxyribonucleic acid, dehydrated xanthogenate cellulose, polytetracyano-ethylene magnesium, polydiethynylbenzene, polydiethynyl diphenoxide, polymethyl- β -chlorovinylketone and polyphenylacetylene were plotted and the iron content was determined. This was found to be $9.2 \cdot 10^{-2}$ to $1.1 \cdot 10^{-3}$ % in synthesized compounds, $1.2 \cdot 10^{-2}$ to $1.0 \cdot 10^{-1}$ in DNA. In some specimens of polydiethynyl benzene the iron content was so low that the ferromagnetism observed could not be explained by these impurities. Since the main portion of the metal is in ionic form it has no effect on the ferromagnetism. The effect under in-

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On the ferromagnetism ...

S/020/63/148/002/030/037
B189/B101

vestigation cannot, therefore, be caused by the impurities. Specimens of higher purities are necessary to give a definite explanation of this problem. There is 1 table.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR) ✓

PRESENTED: July 11, 1962, by A. N. Frumkin, Academician

SUBMITTED: July 3, 1962

Card 2/2

SUKHORUKOV, B.I.; POLTEV, V.I.; BLYUMENFEL'D, L.A.

Ionization of bases and proton transfer in nucleic acids and their components. Dokl. AN SSSR 149 no.6:1380-1383 Ap '63.

(MIRA 16:7)

1. Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom M.I.Kabachnikom.

(Nucleic acids) (Protons) (Ionization)

BLYUMENFEL'D, L.A.; VOYEVODSKIY, V.V.; SOLODOVNIKOV, S.P.

Nature of ion radicals formed during interaction of potassium and sodium with some aromatic hydrocarbons. Izv.AN SSSR. Ser.khim. no.1:158-160 Ja '64. (MIRA 17:4)

1. Institut khimicheskoy fiziki AN SSSR.

ACCESSION NR: AP4011500

S/0051/64/016/001/0155/0159

AUTHOR: Chetverikov, A.G.; Chernyakovskiy, F.P.; Blyumenfel'd, L.A.; Lyubchenko, L.S.; Moshkovskiy, Yu.Sh.

TITLE: Light induced paramagnetic centers in triphenylmethane dye crystals

SOURCE: Optika i spektroskopiya, v.16, no.1, 1964, 155-159

TOPIC TAGS: paramagnetic center, color center, photoreaction, triphenylmethane dye, brilliant green, malachite green, EPR, photocoloring, photobleaching

ABSTRACT: In recent years a number of investigators have reported observing the appearance of paramagnetic centers in pigment and dye crystals under the influence of illumination. The present paper gives the results of preliminary experiments on the influence of illumination as regards formation of paramagnetic centers in the crystals of some triphenylmethane dyes, namely, brilliant green (I), and two methylated derivatives of malachite green (II & III), synthesized by the Grignard reaction. The structural formulas of the investigated dyes are shown in the Enclosure. The EPR spectra were measured on an EPR-2 IKhF spectrometer; the absorption and reflection spectra on an SF-10 spectrophotometer. In agreement with the results of V.E.

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ACC.NR: AP4011500

Kholmogorov and D.N.Glebovskiy (Opt. i spektr. 12,726/1962) and in contrast with the results of F.I.Chernyakovskiy, A.Ye. Kalmanson and L.A. Blyumenfel'd (Ibid. 9,786, 1960), the crystals of the investigated dyes precipitated from solution in the dark did not yield an EPR signal. EPR signals disappear upon illumination of the dye crystals with the light from a 3 watt incandescent lamp. It was found, in fact, that two types of paramagnetic centers form in dye I. Heating of the crystals results in fading of the EPR signal. In the course of the investigation it was also found that in addition to formation of paramagnetic centers, illumination results in reversible change in the color of the dye. A tentative interpretation of the results is given, but thorough analysis must await completion of quantitative measurements which are now underway. Orig.art.has: 3 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 15Apr63

DATE ACQ: 14Feb64

ENCL: 01

SUB CODE: PH

NR REF SOV: 008

OTHER: 003

Card

2/82

ACCESSION NR: AP4020958

S/0051/64/016/003/0467/0474

AUTHOR: Benderskiy, V.A.; Shevchenko, I.B.; Blyumenfel'd, L.A.

TITLE: Electric and magnetic properties of donor-acceptor crystals. 1. Complexes formed by strong donors and acceptors

SOURCE: Optika i spektroskopiya, v.16, no.3, 1964, 467-474

TOPIC TAGS: EPR spectrum, absorption spectrum, dark conductivity, donor acceptor crystal, donor acceptor complex, complex crystal, chloranil, tetra-chloroquinone, para-phenylenediamine, benzidine, iodine, charge exchange, polar crystal model

ABSTRACT: The electric and magnetic properties of complexes with charge transfer in the solid phase have attracted the attention of many investigators. (A review of recent research in the field has been published by L.A.Blyumenfel'd and V.A.Benderskiy, Strukturnaya khimiya, 4,405,1963.) The present work was devoted to investigation of the EPR spectra, the absorption spectra in the visible and infrared regions, and the dark conductivity, as well as the temperature dependences of these parameters, of complexes of chloranil (tetrachloroquinone) with para-phenylenediamine (1) and benzidine with iodine (2). The EPR spectra were recorded by means of a standard

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ACCESSION NR: AP4020958

EPR spectrometer with provision for maintaining the sample at temperatures from 90 to 380°K. The dark conductivity was investigated by the potentiometric method. Most of the measurements were made on compacted powder pellets, but some were made using single crystals (complex 1 only). The absorption spectra were measured using SF-4 and IKS-14 spectrophotometers with the specimens in the form of sublimated layers. The EPR spectrum of complex 1 was also obtained in methyl alcohol solution. The results are presented in the form of curves. Single crystals of complex 1 exhibit a single narrow EPR peak (0.4 Oe) with a complex exponential temperature dependence. The activation energy for exchange interaction agrees with the energy for excitation of the host to the magnetic state. The activation energy is not connected with singlet-triplet splitting. In the case of complex 2 the anisotropy of the EPR signal depends on temperature. The peaks in the absorption spectra agree with the values of the activation energy for dark conduction: 1.17 and 0.48 eV for complexes 1 and 2, respectively. The infrared absorption spectra of the complexes differ markedly from the spectra of the constituent components. The results are discussed from the standpoint of the crystal model with low-lying polar states. Orig.art.has: 5 figures and 2 tables.

Card 2/32

ACCESSION NR: AT4008633

S/3039/63/000/000/0045/0052

AUTHOR: Blyumenfel'd, L. A. ; Kalmanson, A. E.

TITLE: Study of radiation and chemical effects on biological materials by the electron paramagnetic resonance method

SOURCE: Pervichny*ye i nachal'ny*ye protsessy* biologicheskogo deystviya radiatsii. Moscow, 1963, 45-52

TOPIC TAGS: radiation effect, chemical effect, free radical, ionizing radiation, biological structure, irradiated amino acid, irradiated protein, electron paramagnetic resonance spectrum, gamma radiation, nucleoprotein, nucleic acid, EPR spectrum, EPR method, deoxyribonucleic acid, DNA

ABSTRACT: Following an extensive review of the literature on the electron paramagnetic resonance (EPR) technique, the authors report that when crystalline amino acids in the dry state were irradiated with 10^6 - 10^7 r from a cobalt source, intensive EPR spectra were obtained, showing a characteristic pattern which depends on the amino acid structure. In most amino acids, 10^7 r caused the appearance of free radicals equivalent to about 10^{19}

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ACCESSION NR: AT4008633

paramagnetic units/g of amino acid. The effect was due primarily to interaction of unpaired electrons with protons and with nitrogen nuclei. However, in sulfur-containing amino acids, the g-factor was altered, due to localization of the unpaired electrons in the sulfur atom. Irradiation of native proteins or of lyophilized tissues containing up to 60-80% protein gave a completely different EPR spectrum, showing a reduction in the number of free radicals by a factor of 2-3 and lacking the resolution of the spectra of the component amino acids. The spectra obtained appeared as single narrow peaks without specific structure. Similar results were obtained when enzymes were frozen and lyophilized in the presence of substrate. Irradiation of nucleic acids, nucleoproteins, DNA, and of various complex nucleic acids also revealed formation of free radicals characteristic of the nucleoside structures. However, whereas irradiation of a nucleoside produced free radicals equivalent to 10^{18} - 10^{19} paramagnetic units, this intensity was reduced by a factor of 2-3 when irradiation was performed on high molecular weight nucleic acids. This is considered important, since radiation damage to nucleic acid molecules is 10-50 times higher in high-molecular-weight polynucleotides than in low-molecular-weight compounds. A possible effect of added water on the electron paramagnetic resonance spectra of irradiated biological molecules is discussed.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR, Moscow (Institute of Chemical Physics AN SSSR)

ACCESSION NR: AT4008633

SUBMITTED: 00

SUB CODE: LS

DATE ACQ: 20Dec63

NO REF SOV: 012

ENCL: 00

OTHER: 012

Card 3/3

KALMANSON, A.E.; KHARITONENKOV, I.G.; CHETVERIKOV, A.G.;
ELYUMENFEL'D, L.A.

Vapor-flow technique in the investigation of electron spin
resonance spectra of free radicals under heterogeneous con-
ditions. Biofizika 8 no.6:722-727 '63. (MIRA 17:7)